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COTTON FIBER RESEARCH DIVISION

UNITED STATES DEPARTMENT OF AGRICULTURE

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TITLE

PRELIMINARY ESTIMATES OF FARM PRODUCTS, BY- PRODUCTS AND WASTES AVAILABLE FOR INDUSTRIAL USE

Prepared by

The Committee of the United States Department of Agriculture on Industrial Utilization of Farm Products and By-Products

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PRELIMINARY REPORT OF THE DEPARTMENTAL COMMITTEE ON AGRICULTURAL BY-PRODUCTS

The Committee on Agricultural By-Products has, up to the present time, devoted its efforts entirely to the securing of data on which definite recommendations can be based. This task has proven unexpectedly difficult. Crop figures are in many cases lacking, or considered confidential, as in the case of some co-operatives, or, when actually reported, are found in different production units or for varying periods. In addition, the information regarding the quantities of agricultural products and by-products used for industrial purposes is difficult to obtain, especially where such utilization is limited to a few organizations. It has, therefore, been necessary for the Committee to accumulate facts in whatever State available, and then, by means of careful study, to coordinate them to a form in which they will be of value as a foundation for considered action.

This compilation of facts has taken a great deal of time. Nearly seven months have elapsed since the appointment of the Committee, so that it is felt that a preliminary report should be presented in order to give some idea of the work accomplished during this period.

The first consideration of the Committee was given to the "Order of Crops, Production, and Farm Value for 1933", as prepared for the Agricultural Year Book. It was immediately evident that certain crops, by reason of their relative unimportance, did not merit consideration at this time. Others, prominent in volume and value, were omitted as unlikely to provide by-products of commercial significance. Twenty-crops--corn, cotton and cottonseed, wheat, potatoes, oats, tobacco, apples, barley, oranges, sweet potatoes, peanuts, peaches, rice, lemons, rye, grapefruit, soybeans, flaxseed, and sugarcane--were finally chosen as those which the Committee thought most probable to be included in any field of integrate

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research which might be embodied in its final report. It must not be concluded that the omission of any crop or by-product from this list is to be taken as evidence of a lack of interest on the part of the Committee. Some preliminary basis for final action was required, and the elimination of a part, at least, of the enormous field open to the consideration of the Committee seemed a necessary step in the right direction. An examination of the data relating to any of the crops omitted is possible at any time, provided that such action seems advisable.

The twenty crops chosen have been studied, the available data secured, and the results coordinated in the form found in the tables attached to this report. The facts as actually determined have been supplemented in many cases by estimates based on certain presumptions, and in some cases by actual guesses, founded on a general knowledge of the field. In every case presumptive figures and guesses have been clearly indicated. A list of sources is also appended.

It is the intention of this Committee to give careful consideration to these tables in the form in which they have finally been prepared, and to make definite recommendations for a course of action to be followed by the Department of Agriculture in dealing with this problem.

I N D E X

SUMMARY OF STATISTICS ON CORN

Most of the statistics given, unless otherwise stated, are the average for the five-year period from 1929 to 1933, inclusive. In the case of statistics from the Census of Manufactures, which is taken at two-year intervals, the figures are the average for 1927, 1929, and 1931. In the case of corn used for the production of alcohol, distilled spirits, malt liquors and cereal beverages, the figure for 1934 was used, because prior to that year utilization for these purposes was limited by prohibition legislation.

(a) Total acreage in corn ..... 103,353,000 acres
(Av.1929-33)

(b) Average yield per acre ..... 24 bushels

(c) Production, grain equivalent of total acreage .....2,489,570,000 bushels

(d) Production, harvested as grain .....2,131,210,000 bushels
(from 85-1/3% of acreage)

(e) Corn sold ..... 365,033,000 bushels
(14.7% of total crop, grain equivalent, calculated from production, and ratio of cash income to farm value)

(f) Receipts at primary markets ..... 210,007,000 bushels
(average 1928-1932)

(g) Net exports (included in "f") ..... 12,804,000 bushels

(h) Industrial utilization in United States:-

(1) Milling industry, corn ground (Census, 1927,1929,1931)79,683,000 bushels

(2) Breakfast foods .....Est. 10,000,000 bushels
(Census, 1927, '29, '31, Av.349,500,000 lbs.)

(3) Wet-process industries ..... 73,127,000 bushels
(Starch, dextrin, glucose, oil, etc.)

(4) Ethyl alcohol and alc. beverages (fis. yr. 1934) ... 14,948,000 bushels

(5) Butyl alc. and acetone (fis.yrs.1931,'32 and '33) .. 3,164,000 bushels

Approximate total industrial utilization ..... 180,922,000 bushels

(i) Stocks, end of year ..... 256,125,000 bushels
(Av.1929-30 to 1933-34)(1929-30, 136,700,000; '33-'34, 330,543,000)

(1) Stocks on farms ..... 225,577,000 bushels
(Oct.1,1930, 131,845,000; Oct.1,1934, 266,740,000)

(2) Commercial stocks ..... 30,548,000 bushels
(Oct.1,1930, 4,855,000; Oct.1,1934, 63,803,000)

Corn (Continued)

(j) By-products from corn harvested as grain:-

(1) Stover ..... 71,625,000 tons
(B.P.I. est., using stover to grain ratio of 1.2:1)

(2) Cobs ..... 13,131,000 tons
(B.P.I. est., using cobs to grain ratio of 0.22:1)

Only the cornstalks from concentrated areas of production, and the cobs collected at mills and elevators, would ever be available for industrial uses. It is assumed that the most concentrated area of production would include all the corn in Iowa, 90 per cent of that in Illinois, 70 per cent of that in Nebraska, Missouri, and Indiana, and 60 per cent of that in Ohio. Adding these percentages of the average annual acreage of corn harvested as grain in the respective States during the period 1929-1933 gives 32,083,000 acres. Taking H.A. Webber's average figure of 2 tons of bone-dry stover per acre in the Corn Belt (Ind. Eng. Chem. 21, 270, March,1929), and applying it to this acreage gives 64,166,000 tons of bone-dry stover. On the basis of G.M. Rommel's statement that approximately one-half of the weight of corn stover is in the leaves and husks ("Farm Products in Industry"), this quantity of stover would correspond to about 32,083,000 tons of bone-dry stalks.

Assuming that 10 per cent of the corn crop harvested as grain goes to mills and elevators, and that 70 pounds of husked ear corn (accepted as the equivalent of one bushel or 56 pounds of shelled corn) yields 12 pounds of cobs, the total quantity of cobs collected at mills and elevators averaged about 1,492,000 tons from 1929 to 1933.

(k) By-products of corn available for industrial uses:-

(1) Corn stalks, bone-dry (estimated above) ..... 32,083,000 tons

(2) Corn cobs (estimated above) ..... 1,492,000 tons

(l) By-products of corn utilized for industrial purposes:

(1) Corn stalks ..... Not over .... 15,000 tons
(intermittently by 2 commercial firms: for paper pulp and fiber board)

(2) Corn cobs ..... Guess ..... 50,000 tons
(by one commercial firm and its licensees: for mechanical products including feeds, absorbent material for mixed feeds, materials for removing oil from tin plate, cleaning furs, fillers, packing materials, filtering medium, etc.)

(Except where noted, statistics are the average figures for the five-year period from 1929 to 1933, inclusive)

(a) Acreage in cultivation July 1 ..... 40,860,000 acres

(b) Acreage harvested ..... 38,064,000 acres

(c) Average yield per acre, lint ..... 182.9 lbs.

(d) Production, lint .....14,380,000 bales (500 lbs.gross)

14,388,000 running bales

(e) Carry-over from previous season ..... 6,075,000 running bales

(f) Quantity shipped (revenue freight) ..... 12,444,000 bales (500 lbs.gross)

(g) Exports (included in "f") ..... 7,622,000 running bales

(h) Industrial utilization in United States:

Textile industries ..... 5,614,000 running bales

Non-textile industries (by difference) ..... Not over 50,000 bales

(i) Stocks on hand, end of year ..... 7,179,000 running bales

(j) By-products from cotton crop, other than seed and seed products:-

Stems and pods (B.P.I. est., using 2:1 as ratio of stems and pods to combined seed and lint) 20,012,000 tons

Only the stems and pods from the most concentrated areas of cotton production are believed to be available for industrial utilization. These areas are assumed to include 80 per cent of the cotton in Tex., Ark., Okla., and S. Car., 70 per cent of the cotton in La., Miss., and Ga., 60 per cent of the cotton in Ala., and 90 per cent of the cotton in N. Car. Adding these percentages of the average annual production of cotton in the respective States during the period 1929-1933 gives 10,020,000 bales, or 2,505,000 tons, which is 70 per cent of the total U.S. production. This quantity of lint corresponds to 7,157,000 tons of combined seed and lint on the usual assumption that there are 65 lbs., of seed for each 35 lbs. of lint, and to 14,314,000 tons of stems and pods (2:1 being the ratio of stems and pods to combined seed and lint used by B.P.I.).

(k) By-products from cotton crop, other than seed and seed products, available for industrial uses:-

Stems and pods (est. above) ..... 14,314,000 tons

(l) By-products from cotton crop, other than seed and seed products, utilized for industrial purposes ..... Apparently none

SUMMARY OF STATISTICS ON COTTON SEED

Except where noted, statistics are the average figures for the three-year period from 1930-1931 to 1932-1933, inclusive

(a)	Acreage harvested	39,033,000 acres
(b)	Average yield per acre (Estimated from the production of lint)	0.167 ton
(c)	Production (Av.1930-32) (Estimated from the production of lint)	6,525,000 tons
(d)	Used for seeding (Av. 1931-1933)	487,000 tons
(e)	Cotton seed taken by mills	4,821,000 tons
(f)	Cotton seed crushed for oil	4,888,000 tons
(g)	Crude oil produced	763,615 tons
(h)	Exports of cotton seed oil	18,636 tons
(i)	Factory consumption of oil in United States:-	
	(1) For edible products	495,157 tons
	(2) For soap	2,087 tons
	(3) For paint and varnish	18 tons
	(4) For printing ink	5 tons
	(5) For miscellaneous products	1,113 tons
	(6) Loss and foots in factory consumption of oil	58,221 tons
(j)	Linters produced from cotton seed (814,000 running bales)	238,191 tons
(k)	Exports of Linters (137,333 running bales) (Est.)	39,689 tons
(l)	Consumption of linters (704,000 running bales) (Est.)	203,456 tons
	(1) For textiles, 1929 (included in "j")	44,823 tons
	(2) For chemical cotton, 1929 (Est.)	50,000 tons
(m)	Cake and meal produced	2,220,000 tons
(n)	Exports of cake and meal	137,000 tons
(o)	Cake and meal used for fertilizer (Av.1931-2 to 1933-4) (Estimated, American Fertilizer, Apr.6,1935, pp.11-12)	333,000 tons

Cotton Seed (Continued)

(p) Meal used in manufacture of mixed fertilizers ..... 70,000 tons
(Av. 1929 and 1931) (Included in "o")

(q) Cotton seed hulls produced ..... 1,376,000 tons

(r) Cotton and hulls utilized ..... No estimate

Cotton seed hulls are used to a large extent as packing material and as cattle feed roughage. Information on the quantities used for these or other purposes is not available.

SUMMARY OF STATISTICS ON WHEAT

Statistics of production and exports are the average of figures given in the Year Book of Agriculture for 1927, 1929 and 1931, in order that they may be compared with Census statistics of consumption for the same years (the latest available). In the case of other statistics which could not be found for these years, the period is noted in parentheses.

(a) Acreage seeded ..... 66,018,000 acres

(b) Acreage harvested ..... 60,017,000 acres

(c) Yield per acre ..... 14.7 bushels
(1927, 14.7; 1929, 13.0; 1931, 16.3)

(d) Production .....876,378,000 bushels
(1929, 822,180,000; 1931, 932,221,000)

(e) Used for seed ..... 85,148,000 bushels

(f) Fed to livestock ..... 91,624,000 bushels
(1927, 44,461,000; 1931, 171,258,000)

(g) Ground at mills for home use ..... 10,392,000 bushels

(h) Sold or for sale .....691,224,000 bushels
(79% of production)

(i) Net exports (included in "h") .....151,571,000 bushels
(including grain equivalent of flour)

(j) Industrial utilization in United States:-

(1) Ground for flour .....538,798,000 bushels

(2) Breakfast foods (value $41,198,000) ..... Est. 10,271,000 bushels

(3) Wheat equivalent of flour washed for starch ..... 639,000 bushels
(included in "j-1") (Av.1928-32)

(4) Alcohol and distilled spirits:- (None in fis.yr.1928)

Fiscal year 1930 ..... 11,900 bushels

Fiscal year 1932 ..... 3,311,441 bushels
(Because of high 1931 wheat production and unusually low price)

Fiscal year 1933 ..... 6,480 bushels

(5) Butyl alcohol and acetone (fiscal year 1932) ..... 331,000 bushels

(6) Coffee substitutes ..... 275,000 bushels
(Av. quantity 20,605,770 lbs., assumed to be 80% wheat)

Wheat (Continued)

(k) Stocks of wheat as grain, end of year, total ..... 270,630,000 bushels
(July 1,1928, 123,865,000; 1930, 303,461,000; 1932, 384,564,000)

(1) Stocks on farms ..... 57,477,000 bushels
(July 1,1928, 19,567,000; 1932, 92,772,000)

(2) In country elevators and mills ..... 40,343,000 bushels

(3) Other stocks as grain ..... 172,810,000 bushels

(l) Stocks of flour in terms of wheat, end of year ..... 12,186,000 bushels

(m) By-products from production of wheat:-

Straw ..... 49,954,000 tons
(Est. from weight of grain, using straw to grain ratio of 1.9:1, suggested by B.P.I.)

It is assumed that 25 per cent of the straw produced may be advantageously used on farms and that the remainder, in baled form, may be taken to market as easily as wheat

(n) Wheat straw available for industrial uses .....Est.... 37,465,000 tons

(o) Industrial utilization of wheat straw:-

For paper and fiber board ..... 575,263 tons
(Mostly wheat straw) (1929)

SUMMARY OF STATISTICS ON POTATOES

The statistics are in most cases the averages of figures for the years 1931, 1932 and 1933. The figure for starch produced from potatoes is the average for 1929 and 1931, from the 1932 Census of Manufactures.

(a) Total acreage ..... 3,313,000 acres
(Commercial and non-commercial)

(b) Average yield per acre on total acreage (105.7 bu.) ..... 3,171 tons

(c) Total production .....10,510,800 tons
(Commercial and non-commercial)

(d) Acreage in commercial production ..... 2,449,000 acres
(Early commercial and late surplus)

(e) Total Commercial production ..... 8,544,540 tons
(Early commercial and late surplus)

Early commercial crop
Acreage ..... 291,500 acres
Production ..... 1,102,050 tons

Late surplus crop
Acreage ..... 2,157,500 acres
Production ..... 7,442,490 tons

(f) Potatoes sold ..... 6,411,600 tons
(Est. from production, farm value, gross income and cash income) (61%)

(g) Production of certified seed potatoes (included in "c") ..... 238,300 tons

(h) Net imports of potatoes ..... 14,320 tons

(i) Industrial utilization of potatoes in United States:-

(1) For starch (in Maine) ..... 52,960 tons

(2) For alcohol production ..... None

(j) By-products of potato crop:-

Vines (probably of no commercial value) ..... No Estimate Made

Culls (Estimated 10% of crop) ..... 1,051,000 tons

SUMMARY OF STATISTICS ON OATS

Except where noted, statistics are average figures for the period 1929 to 1933, inclusive.

(a) Acreage harvested ..... 39,201,000 acres
(1933, 36,701,000; Av. 1929-32, 39,826,000)

(b) Average yield per acre ..... 27.9 bu.
(1933, 19.9; Av. 1929-32, 29.9)

(c) Production ..... 1,100,151,000 bu.
(1933, 731,500,000; Av. 1929-32, 1,192,313,000)

(d) Oats sold .....196,012,000 bu.
(17.8% of crop, calculated from production and ratio of cash income to farm value)

(e) Net exports (incl. grain equivalent of meal) ..... 4,216,000 bu.
(1933, 1,251,000; 1929, 7,680,000)

(f) Industrial utilization in United States:-

(1) Ground for meal ..... 23,910,000 bu.
(Av. 1927, 1929, and 1931)

(2) Breakfast foods ..... 44,064,000 bu.
(Av. 1927, '29, '31, 799,613,000 lbs.)

(3) Alcohol and distilled spirits .....Practically none
(1934, 274 bu. in Ill.)

(4) Fermented alcoholic liquors ..... None

(g) Hulls obtained as by-product in industrial utilization ..... 321,475 tons
(Estimated from "f", assuming oats contain 30% by weight of hulls)

(h) Hulls utilized for industrial purposes .....About 5,000 tons
(Furfural production (about 2,000,000 lbs.; 20% yield))

(i) Stocks of oats at end of year, total .....169,662,000 bu.
(On July 1, 1933, 232,802,000 bu.; 1934, 130,946,000 bu.)

(1) Stocks on farms (1933, 204,372,000; 1934, 107,577,000) 153,460,000 bu.

(2) Commercial stocks (1931, 7,525,000; 1933, 28,430,000) 16,202,000 bu.

(j) By-products from oats crop:-

Straw (est. from production of grain, using straw to grain ratio of 1.3:1, suggested by B.P.I.) ..... 22,883,000 tons

Oats straw is more useful than other cereal straws as a roughage feed for horses, mules, cattle and sheep, and comparatively little is wasted. It is not used extensively in manufacturing, and is not likely to be used as a raw material for industrial processes in view of the great abundance of other straws.

SUMMARY OF STATISTICS ON TOBACCO

The statistics are the averages of figures for the five-year period, 1929 to 1933, inclusive

(a) Acreage harvested ..... 1,853,400 acres

(b) Average yield per acre ..... 771.4 lbs.

(c) Total production, unmanufactured tobacco .....1,434,397,000 lbs.

(d) Production in terms of stemmed tobacco (Est. 75%) .....1,075,798,000 lbs.

(e) Net exports of unmanufactured tobacco ..... 435,292,000 lbs.

(f) Tobacco used in manufacture of cigars, cigarettes and other products ..... 745,928,000 lbs.

(g) Stocks, unmanufactured, from previous yrs., Oct.1 (green wt.) .....2,023,000,000 lbs.
(1929, 1,709,500,000; 1932, 2,402,300,000; 1933, 2,235,600,000)

(h) By-product of tobacco manufacture, stems and midribs ..... 186,482,000 lbs.
(Est. 25%)

(i) Tobacco by-product (stems and midribs) used for indus. purposes:-

(1) For manufacture of nicotine and nicotine extracts 28,571,000 lbs.
(Assuming 1,000,000 lbs. of nicotine alkaloid as annual production and 3.5% as average yield)

(2) For tobacco dust insecticide ..... No estimate
(No information available)

(j) Tobacco extracts produced ..... 3,333,000 lbs.
(Assuming 1,000,000 lbs. of nicotine alkaloid as annual production and 30% nicotine content in extracts)

(k) Tobacco extracts exported ..... 1,706,000 lbs.

The statistics are the averages of figures for the years 1930, 1931 and 1932, except as noted in parentheses.

(a) Total number of apple trees in United States (1930)....About 116,100,000

(b) Bearing apple trees in U.S. (1930) (Est. 76%).....About 88,200,000

(c) Non-bearing apple trees in U.S. (1930) (Est. 24%).....About 27,900,000

(d) Average yield per tree (1930) .....1.74 bu.= 0.0418 tons
(Est. from "b" and total production in 1930)

(e) Total production .....165,505,000 bu. = 3,972,120 tons

(f) Apples used in farm homes, 18.3% (Av.1930 and 1931)..... 781,444 tons
(Est. from total production, farm value, gross income and cash income)

(g) Apples retained on farms for feed and quantity unfit for sale and consumption, 4.0% (Av.1930 and 1931).... 170,808 tons
(Est. like "f")

(h) Apples sold, 77.7% (Av.1930 and 1931) (Est.like "f" and "g" 3,317,936 tons

(i) Apple trees in commercial orchards (1930).....About 84,691,000

(1) Under 9 yrs. old (1930), about 30.8% 26,063,000

(2) From 9 to 18 yrs. old (1930), about 36.5% 30,964,000

(3) 19 years old and over (1930), about 32.7% 27,664,000

(j) Commercial crop, sold for consumption as fresh fruit (incl. in "e"):-
(1931, 103,776,000 bu.; 1932, 85,575,000 bu.) 96,713,000 bu.= 2,321,112 tons

(k) Net exports, including dried and canned apples in terms of fresh fruit ..... 21,696,000 bu. = 520,704 tons

(1) Exports of fresh apples ..... 17,375,000 bu. = 417,000 tons

(2) Exports of dried apples ..... 17,713 tons

(l) Apples used for manufactured products:-

(1) Canned apples (1931-33) Prod. 2,207,850 cases .....Est.43,428 tons

(2) Apple sauce (1931) Prod. 1,009,688 cases

(3) Dried apples (1931-'33) Prod. 43,819,536 lbs.,
Fresh fruit equiv. .....About 109,549 tons

(4) Apple cider and vinegar ..... Est. 75,757 tons

(5) Apple brandy (1934). Used 11,605,565 gals. of cider, 15,200 gals. of pomace residuum, and 80,000 pounds of pomace.

(6) Apple jelly (1930). Prod. 5,429,509 lbs.(Partly from apple pomace)

Apples (Continued)

(m) Apple wastes from manufacturing processes ..... Est. 63,847 tons

(1) Waste from drying plants, skins and cores, 20% raw material ..... Est. 21,910 tons

(2) Waste from cider and vinegar plants, pomace, 33% of raw material ..... Est. 25,000 tons

(3) Waste from canneries, 39% of raw material ..... Est. 16,937 tons

(Apple pomace is used for feed, fertilizer, and the manufacture of jelly, brandy and pectin. The skins may be used for the extraction of wax which contains ursolic acid and nonocosane).

(n) Apple surplus and culls, estimated at 6% of total crop .... 238,327 tons

(o) Surplus and culls from apple crop, available for industrial utilization, estimated at 50% of total quantity .. 119,163 tons
(May be used for production of wine and brandy)

SUMMARY OF STATISTICS OF BARLEY

Statistics of production, exports, and stocks at end of year, are the average of figures given in the Yearbook of Agriculture for 1927, 1929, and 1931, in order that they may be compared with Census statistics of consumption for the same years (the latest available).

(a) Acreage harvested ..... 11,471,000 acres

(b) Average yield per acre ..... 21.2 bu.

(c) Production ..... 239,614,000 bu.

(d) Sold ..... 73,034,000 bu.
(30-1/2 per cent of crop, calculated from production and ratio of cash income to farm value)

(e) Net exports (yr. begin. July 1) (incl. grain equivalent of flour and malt (1927-28, 39,230,000; 1931-32, 3,960,000). 22,401,000 bu.

(f) Industrial utilization in United States:-

(1) Barley ground ..... 7,860,000 bu.

(2) Barley malted ..... 19,216,000 bu.
(Est. from value of malt produced, value of quantities exported, and malt to barley ratio of 1.1:1).

(3) For alcohol and distilled spirits, exclusive of malt..... None
(21,320 bu. were used in the fiscal year 1930, the only year since 1916 when barley was used)

(g) Imports of malt, grain equivalent (yr. begin. July 1) .....346,500 bu.
(1927-28, 22,139; 1931-32, 940,428)

(h) Stocks of barley, end of year (Aug. 1) ..... 12,782,000 bu.

(1) Stocks on farms ..... 8,231,000 bu.

(2) Commercial stocks ..... 4,551,000 bu.

(i) By-product from barley crop:-

Straw (est. from production of grain, using straw to grain ratio of 1.2:1, suggested by B.P.I.).... 6,901,000 tons

(j) Barley straw available for industrial uses, estimate ..... 5,176,000 tons
(Assuming that 25 per cent of production can be used to advantage on farms)

(k) Industrial utilization of barley straw ..... Information not available

It is possible that a small proportion of the straw used for the manufacture of paper and fiber board is barley straw. However, since the greater part of the barley is produced in States which have no straw pulp mills, and the quantity available elsewhere is relatively small in comparison with wheat straw and rye straw, the quantity of barley straw used for paper and fiber board would be negligible.

SUMMARY OF STATISTICS ON ORANGES

The statistics are the averages of figures for the three years, 1930-31 to 1932-33, inclusive, except as noted in parentheses.

(a) Number of orange trees, 1930 (Total, 31,958,000) ..... bearing 24,363,000

(b) Total production in U.S. (52,267,330 boxes) ..... about 1,941,650 tons
(California 34,878,000 boxes; Florida, 16,544,000 boxes)

(c) Production in Puerto Rico ..... about 41,500 tons
(Rough approximation 1,000,000 boxes)

(d) Shipments to U.S. from Puerto Rico (23,900 boxes) ..... about 992 tons

(e) Oranges consumed as fresh fruit (44,111,700 boxes) ..... about 1,640,000 tons
(Commercial crop) (Estimated by University of California)

(f) Imports of oranges and mandarins from foreign countries .. about 426 tons
(12,162 boxes) (Principally from Japan; some from Cuba)

(g) Exports of fresh oranges from U.S. (3,295,900 boxes) ..... about 127,782 tons

(h) Exports of fresh oranges from Puerto Rico (1,900 boxes) .. about 79 tons
(not including shipments to United States)

(i) Oranges used in manufacturing:-

(1) Orange juice (production 1931, 99,209 cases) .....Complete statistics not available
(Av. production in Florida, 52,786 cases)

(2) Citrus marmalade .....Complete statistics not available
(Production 1930, incomplete data, 3,407,816 lbs.)

(3) Candied orange peel ..... No statistics

(4) Orange brandy ..... No statistics
(Orange wine and juice used, 1934, 16,174 gals.)

(5) Orange oil .....Complete statistics not available
(Av. annual production, Florida only, 8,000 to 10,000 lbs. Production of 20,000 lbs. planned for 1935-36; market will absorb possibly up to 100,000 lbs.)

(j) By-products from factories using oranges ..... 1,602 tons
(Waste from juice plants, Florida only, av. 1929-34) (Information for California not available)

Only present use is for fertilizer. May be used for feed and for manufacture of pectin. The seeds may be pressed for fixed oil, with press cake as a by-product. Nesperidin may be extracted from peels. Uses for orange seed oil, press cake and nesperidin not yet developed).

Oranges (Continued)

(k) Surplus oranges, California only, av. per year ..... 60,000 tons

(Surplus is used to a considerable extent for the manufacture of volatile orange oil, pectin, and beverage base. The extracted waste, after drying, is used for feed. Information on quantity of oranges used and quantities of products not available. The yield of juice is about 100 gallons per ton when burred or about 80 gallons per ton when pressed. The yield of orange oil varies from 6 to 12 pounds per ton of fruit. Orange peel contains from 2 to 4 per cent of pectin).

SUMMARY OF STATISTICS ON SWEETPOTATOES

The statistics are the averages of figures for the years 1931, 1932 and 1933, except as noted in parentheses

(a) Acreage harvested ..... 823,000 acres

(b) Average yield per acre (83.6 bu.) ..... 2.3 tons

(c) Production (68,869,000 bu.) .....1,893,900 tons

(d) Sweetpotatoes used in farm homes, 31.4% ..... 594,685 tons
(Est. from total production, farm value, gross income and cash income)

(e) Sweetpotatoes retained for feed and seed, plus those unfit for sale and consumption (est. like "d") (13.6%)..... 257,570 tons

(f) Sweetpotatoes sold (est. like "d" and "e") (55%) .....1,041,645 tons

(g) Sweetpotatoes available for industrial uses (incl. in "e") ..... 171,839 tons

(Estimated 10% (culls and oversize) of production, 62,487,000 bu. or 1,718,392 tons, in regions of most concentrated production, including N.J., Del., Md., and Va.; N.C., S.C., Ga. and Fla.; and Ky., Tenn., Ala., Miss., Ark., La., Okla., and Texas)

(h) Sweetpotatoes used for industrial purposes:-

(1) Used for manufacture of starch for industrial purposes(1934) 700 tons

(1934 was the first year in which sweetpotato starch was produced in an industrial plant. Production began toward the close of the year and was largely for the purpose of testing out the manufacturing process and equipment).

(2) For manufacture of alcohol .....None

(3) For manufacture of diastase .....None

(i) Possible annual consumption of sweetpotato starch .... (Guess) 5,000 tons

Sweetpotato equivalent (estimating starch yield at 12.5%) .... 40,000 tons

(j) Imports of starch, kinds not specified (1931-1933)..... 7,811 tons

(k) By-product of sweetpotato crop, vines .....No estimate

(Basis for estimate not available. Vines appear to give no promise of industrial utilization, except perhaps in ground form as a constituent of mixed feeds).

(l) By-product of sweetpotato starch manufacture:-

Sweetpotato pulp, from possible consumption of starch, "i" .. 3,000 tons
(Estimated as 7.5% of 40,000 tons of sweetpotatoes required to manufacture 5,000 tons of starch)

SUMMARY OF STATISTICS ON PEANUTS

The statistics are the averages of figures for the years 1931, 1932 and 1933, except as noted in parentheses.

(a) Total acreage.....2,216,000 acres
(incl. peanuts planted in corn and peanuts grazed or hogged off)

(b) Average yield per acre on total acreage (652.2 lbs.).....0.3261 ton

(c) Total production, including peanuts grazed or hogged off.....720,009 tons

(d) Acreage of peanuts gathered.....1,457,000 acres

(e) Average yield per acre for peanuts gathered (697.6 lbs.)..... 0.3486 ton

(f) Production, peanuts gathered.....506,913 tons

(g) Peanuts retained on farms for feed and seed plus quantity unfit for sale and consumption (Estimated from total production, farm value, gross income and cash income) (40.29%)..290,092 tons

(h) Peanuts used in farm homes (Estimated like "g") (2.38%)..... 17,136 tons

(i) Peanuts sold (Estimated like "g" and "h") (57.33%).....412,781 tons

(j) Net imports of peanuts (1931).....5,889 tons

(k) Net exports of peanuts (average of 1932 and 1933).....1,905 tons

(l) Peanuts crushed for oil (in-the-hull weight).....26,585 tons

(m) Peanut oil produced.....5,977 tons

(n) Imports of peanut oil (1931, 7,443 tons; 1933, 659 tons).....2,949 tons

(o) Industrial (factory) consumption of peanut oil (1934)

(1) For edible products .....6,218 tons
(2) For soap ..... 73 tons
(3) For printing inks ..... 1/2 ton
(4) For miscellaneous products ..... 25 tons

(p) By-products of peanut oil manufacture:-

(1) Hulls, estimated from "l" assuming 1/3 of wt. is hulls....8,862 tons
(To some extent peanuts are crushed in the hull, and the hulls are included in the press cake.)

(2) Press cake, estimated from "l" and "m", assuming 1/3 of wt. is hulls, and deducting weight of oil from that of hulled nuts.....11,746 tons
(The products and by-products usually total about 95 percent of wt. of peanuts crushed, the remainder being lost as dust and moisture.)

Peanuts (continued)

(q) Peanuts shelled for market, est. from wt. of shelled nuts by adding 50% (1931) (Census of Manufactures, 1931).....209,277 tons

(r) By-product of peanuts shelled for market, hulls, (Est. as in "q") (1931).....69,759 tons

(s) Peanut butter manufactured (from shelled nuts, 1931).....52,204 tons

(t) By-product of peanut crop harvested for nuts, straw.....941,412 tons

(u) Peanut by-products available for industrial utilization:

(1) Hulls, at oil mills and shelling plants.....about 75,000 tons

(Peanut hulls are used as fuel and as a diluent in mixed feeds and fertilizers. They have been used in the past for removing oil from tin and terne plate, but proved unsatisfactory for this purpose. Possible uses include the manufacture of cellulose and xylose.

(2) Press cake (used for feeding livestock)..... None

(3) Straw (useful on farms for feed and humus)..... None
Probably has no value for industrial uses.

SUMMARY OF STATISTICS ON PEACHES

The statistics are the averages of figures for the years 1931, 1932 and 1933, except as noted in parentheses.

(a) Total production of peaches (54,608,000 bu.).....1,310,592 tons.

(b) Quantity not harvested because of adverse market conditions...147,360 tons.
(included in "a") (6,140,000 bu.)

(c) Quantity sold but left on trees (2,709,000 bu.).....65,016 tons.
(included in "b") (Av. for 1931 and 1933)

(d) Peaches used in farm homes (20.7%).....249,761 tons.
(Est. from quantity harvested, or sold, gross income, and cash income)

(e) Peaches sold (79.3%).....956,815 tons.
(Estimated like "d")

(f) Exports of peaches, including dried and canned.....97,392 tons.
(in terms of fresh fruit)(4,058,000 bu.)

(1) Exports of fresh peaches.....2,900 tons.

(2) Exports of dried peaches.....3,951 tons.

(3) Exports of canned peaches.....37,127 tons.

(g) Peaches used in manufacturing:-

(1) Canned peaches, estimate.....190,000 tons.
(Production 1931, 8,616,647 cases) (in California)...186,200 tons.

(2) Dried peaches.....125,933 tons.
(Prod. 1931, 50,303,979 lbs.) (All in California)

(3) Preserved peaches, standard and compound.....Est.1,206 tons.
(Production 1930, 3,867,079 lbs.)

(4) Peach brandy, peach wine and juice used (1934), 3,852 gals.

(h) Wastes from factories using peaches:-

(1) Peach pits (est. 16% of weight of fruit).....50,742 tons.

(2) Skins, trimmings and juice (est. 18% of wt. of fruit canned and preserved).....34,417 tons.

(Peach pits are dried for use as fuel. The shells may be used for the manufacture of activated carbon. The kernels, constituting from 6 to 12 per cent of the weight of pits, may be pressed for fixed oil with press cake as a by-product. Peach skins, trimmings and waste juice may be used for the production of brandy.)

(i) Surplus and culls from peach crop (Est. 20%).....262,000 tons.

(j) Surplus available for indus. utilization, est.....157,200 tons.
(Surplus peaches may be used for the manufacture of brandy)

SUMMARY OF STATISTICS ON RICE

Statistics on production, receipts at mills, and exports, are the averages of figures for 1927, 1929 and 1931 (given in the Year Book of Agriculture), in order that they may be compared with Census Statistics on rough rice milled and consumption of cleaned rice for the same years (the latest available). In the case of other statistics which could not be found for these years, the period is noted in parentheses.

(a) Acreage harvested.....949,000 acres.

(b) Average yield per acre (45.7 bu.).....1,028 tons.

(c) Production, as rough rice (43,300,000 bu.).....974,250 tons.

(d) Production in terms of cleaned rice.....601,350 tons.

(e) Rice sold (40,957,000 bu.).....921,533 tons.
(Av. for 1929 and 1931, 95.8% of crop, calculated from production (42,738,000 bu.) and ratio of cash income to farm value)

(f) Rough rice receipts at mills in Tex.,La.,Ark., and Tenn.....748,755 tons.
(Av. production in Calif., 177,615 tons)

(g) Net exports, mostly milled rice, in terms of rough rice.....214,200 tons.
(Year beginning July)

(h) Industrial utilization in United States:-

(1) Rough rice milled (Census).....901,345 tons.

(2) Clean rice produced (Census).....625,422 tons.

(3) Brewer's rice (small broken rice).....22,327 tons.
(Est. from "h-1"; included in "h-2")

(4) Rice polish (Est. from "h-1").....18,027 tons.

(5) Rice bran (Est. from "h-1").....72,108 tons.

(6) Rice hulls and waste (Est. from "h-1").....189,282 tons.

(i) Exports of cleaned rice.....114,765 tons.

(j) Consumption (for food) of domestic cleaned rice.....468,933 tons.
(U.S. and possessions)

(k) For cereal beverages (less than 1/2% alc.)(1929-33).....2,448 tons.
(For fermented liquor and cereal beverages, 1934, 51,481 tons.)

(l) By-product from rice crop, straw.....1,169,000 tons.
(Est. from grain production, using straw to grain ratio of 1:1 for California and Louisiana production, and 1.5:1 for Arkansas and Texas production.)

(m) Rice straw available for indus. utilization.....877,000 tons.
(Assuming that 25% of rice straw is not accessible or can be used to advantage on farms.)

(Rice) (Continued)

(n) Rice straw utilized for industrial purposes:-

One plant having a daily production capacity of 70,000 lbs. started production of wrapping paper from rice straw in California in 1934. Another plant in Louisiana, having a daily production capacity of 110,000 lbs. is believed to be using rice straw for some of its fiber board products.

Estimated consumption of rice straw, 1934, Not over 60,000 tons.

(o) Industrial utilization of by-products of rice milling:-

No estimates.

The principal use for rice hulls is as a fuel for rice mills not located in cities prohibiting their use. Rice bran is used principally for feed. Rice polish (from the inner bran coat) is used in mixed feeds, in dietetics, and for the manufacture of vitamin concentrates.

SUMMARY OF STATISTICS ON LEMONS

The statistics are the averages of figures for the years 1931-32 to 1933-34, except as noted in parentheses.

(a) Number of lemon trees, 1930 (Total 3,167,000).....bearing, 2,824,000.

(b) Total production in United States (7,266,000 boxes).....About 276,108 tons.
(All in California)

(c) Lemons consumed as fresh fruit (5,629,000 boxes).....About 213,902 tons.
(Commercial crop) (Estimated by University of California)

(d) Imports of lemons from foreign countries.....About 4,640 tons.
(122,108 boxes) (Almost entirely from Italy)

(e) Domestic exports of lemons (210,000 boxes).....About 7,980 tons.

(f) Lemons used in manufacturing:

(1) Lemon juice.....No statistics available.

(2) Citric acid, production, 1932, about 2,200,000 lbs.....1,100 tons.

(3) Citrates (mfg. only when there is a large surplus).....No statistics.

(4) Candied peel.....No statistics.

(5) Lemon oil.....No statistics.

(6) Pectin.....No statistics.

(g) By-products from factories using lemons:-

Lemon waste.....No statistics.
(Possible uses: feed and fertilizer; oil and oil cake from seeds.)

(h) Surplus lemons (Av. 1930-32).....56,965 tons.
(Annual reports of Exchange Lemon Products Co., California)

(Surplus lemons are used for bottlers' concentrate, citric acid, oil and pectin. The spent residue is used to some extent for feed. No figures on production are given out. The Lemon Co-operative of California has the surplus lemon situation very well in hand. Lemons pressed for citric acid recovery yield about 120 gallons of juice per ton. The juice contains about 6 per cent of citric acid and yields from 40 to 45 pounds per ton of fruit. From 8 to 12 pounds of lemon oil per ton of fruit are obtained. Lemon peel contains from 2 to 4 per cent of pectin.)

SUMMARY OF STATISTICS ON RYE

Statistics on production and exports are the average of figures given in the Year Book of Agriculture for 1927, 1929 and 1931, in order that they may be compared with Census statistics of consumption for the same years (the latest available). In the case of other statistics which could not be found for these years, the period is noted in parentheses.

(a) Acreage harvested.....3,224,000 acres.

(b) Average yield per acre.....12.3 bushels.
(1927, 15.1; 1929, 11.4; 1931, 10.4)

(c) Production.....39,961,000 bushels.
(1927, 52,111,000; 1931, 32,290,000)

(d) Used for seed.....6,534,000 bushels.

(e) Fed to live stock.....9,337,000 bushels.
(1927, 6,538,000; 1931, 14,100,000)

(f) Ground at mills for home use.....434,000 bushels.

(g) Sold, or for sale.....23,657,000 bushels.
(1927, 38,683,000; 1931, 11,048,000)

(h) Net exports (included in "g").....9,951,000 bushels.
(1927, 26,345,000; 1931, 908,000)

(i) Industrial utilization in United States:- .....1,477,000 bushels.

(1) Ground for flour and feeds.....9,011,000 bushels.

(2) Alcohol and distilled spirits (Av. 1929-1933):-

Fiscal year 1927.....6,787 bushels.

Fiscal year 1929.....8,475 bushels.

Fiscal year 1931.....6,385,363 bushels.
(Year of low exports and low prices)

Fiscal year 1932.....217,934 bushels.

Fiscal year 1933.....564,058 bushels.
(Prohibition Law effective 3/4 year)

Fiscal year 1934.....4,509,273 bushels.
(No Prohibition Law)

Rye has been used commercially in place of corn for the manufacture of butyl alcohol and acetone, when the price differential favored its use.

Rye (Continued)

(j) Commercial stocks, end of year (June).....8,221,000 bushels.
(1927, 2,662,000; 1929, 12,572,000)

(k) By-products from production of rye:

Straw.....27,973,000 tons.
(Est. from wt. of grain, using straw to grain ratio of 2.5:1, suggested by B. P. I.)

For the most part, rye is grown in the same areas that produce wheat, and rye straw can be used for the same purposes as wheat straw. The same assumption may be made, as in the case of wheat straw, that 25 per cent of the straw produced may be advantageously used on farms, and that the remainder would be available for industrial utilization.

(l) Rye straw available for industrial uses.....Est. 20,980,000 tons.

(m) Industrial utilization of rye straw:-

A comparative small part of the straw used for the manufacture of paper and fiber board is rye straw. About 55 per cent of the rye is raised in states which have no straw pulp plants. In the remaining states wheat straw is about 33-1/2 times as abundant as rye straw. Assuming that the 575,263 tons of straw used for the manufacture of paper and fiber board in 1929 included wheat straw and rye straw in proportion to their abundance, the quantity of rye straw would not exceed 17,000 tons.

SUMMARY OF STATISTICS ON GRAPEFRUIT

The statistics are the averages of figures for the three years 1931-32 to 1933-34, except as noted in parentheses.

(a) Number of grapefruit trees, 1930 (Total 9,236,000) .....bearing 5,108,000.

(b) Total production in United States, (14,846,000 boxes) ...About 556,330 tons.
(Florida, 11,095,000 boxes)

(c) Production in Puerto Rico .....About 30,320 tons.
(Rough approximation 758,000 boxes)

(d) Shipments to United States from Puerto Rico, fresh .....About 16,520 tons.
(413,000 boxes)

(e) Grapefruit consumed as fresh fruit (11,422,300 boxes) ...About 424,336 tons.
(Commercial crop)

(f) Imports of grapefruit from foreign countries (91,816 boxes)..About 3,673 tons.
(1931-32, 130,210; 1933-34, 32,677; almost entirely from Cuba)

(g) Exports, fresh grapefruit from United States (970,000 boxes).About 35,570 tons

(h) Exports of fresh grapefruit from Puerto Rico (38,000 boxes)..About 1,520 tons.
(Not including shipments to United States)

(i) Grapefruit used in manufacturing (Statistics for California not available)

Florida .....About 77,706 tons.

Puerto Rico .....About 4,185 tons.

(1) Canned grapefruit .....Complete statistics not available.
(Production in Florida, 1,751,292 cases)

(2) Grapefruit juice .....Complete statistics not available.
(Production in Florida, 527,911 cases)

(3) Grapefruit marmalade .....Separate statistics not available.
(Prod. 1931 included with orange marmalade)

(4) Candied peel .....No statistics.

(5) Alcoholic beverages .....No statistics.

(6) Naringin (small production for flavoring beverages) .....No statistics.
(Potential production about 18,000 lbs.)

(7) Grapefruit oil, annual production in Florida, 3,000 to 5,000 lbs. .....Complete statistics not available.

(Potential production from 50,000 to 100,000 lbs. grapefruit oil contains about 90 per cent limonene.)

Grapefruit (Continued)

(j) By-products from factories using grapefruit:-

Waste from canning plants, Florida only (Av. 1929-1934) .....64,040 tons.
(Information for California not available)

(Only present use is for feed and fertilizer. The seeds may be pressed for fixed oil, with press cake as a by-product. Uses for grapefruit seed oil and press cake not yet developed.)

(k) Surplus grapefruit .....119,840 tons.

(Surplus may be used for the manufacture of alcoholic beverages, candied peel, marmalade, grapefruit oil, naringin, and pectin. The yield of juice is about 100 gallons per ton of fruit when burred. The yield of oil, for which no market exists at present, is around 6 pounds per ton of fruit. Grapefruit peel contains from 2 to 4 per cent of pectin.)

SUMMARY OF STATISTICS ON SOYBEANS

Statistics on production are the averages of figures for the years 1930, 1931, and 1932. Those bearing upon consumption are in most cases the averages of figures for the years 1930-31 to 1932-33, beginning October 1, or for the calendar years 1931 to 1933. In the case of statistics not available for these periods, the period covered is noted in parentheses.

(a) Total acreage (Av. 1930-1932) .....3,253,000 acres.

(b) Acreage grazed or harvested for hay (by diff.) .....2,355,000 acres.

(c) Acreage harvested for beans (27.6%) .....898,000 acres.

(d) Average yield of beans per acre (15.1 bu.) ..... 0.454 ton.

(e) Total quantity of soybeans gathered (13,600,000 bu.) .....408,000 tons.

(f) Soybeans used for seed following year (3,290,000 bu.) .....98,700 tons.

(g) Imports of soybeans for consumption (Av. 1931-33 cal. yr.) .....1,094 tons.

(h) Exports of soybeans (Information not available for 1931)

Inspected for export, 1932 ..... 126,676 tons.

Inspected for export, 1933 ..... 7,666 tons.

(i) Soybeans crushed or ground (Av. 1930-31 to 1932-33, begin.Oct.).122,637 tons.

(j) Soybean oil produced (Av. 1930-31 to 1932-33, begin.Oct.) .....17,285 tons.

(k) Net imports of soybean oil (Av. 1931-33, calendar years) .....37 tons.

(l) Industrial (factory) consumption of soybean oil (Av. 1931-33):-

(1) For edible products .....2,920 tons.

(2) For paint and varnish .....7,436 tons.

(3) For soap .....4,541 tons.

(4) For linoleum and oil cloth .....4,071 tons.

(5) For printing inks .....48 tons.

(6) For miscellaneous products .....2,184 tons.

(m) Soybean cake and meal produced (Est. 80% of beans crushed) .....98,110 tons.

(n) Net exports or imports of soybean cake and meal .....Not available.

(o) Industrial consumption of soybean cake and meal:-

(1) For food products .....Not available.
It is known that most of the soybean cake and meal is used for cattle feed. May also be used for manufacturing soy sauc

Soybeans (Continued)

(2) Non-food products .....Not available.

Some soybean cake and meal is used for molded plastics. May also be used for manufacturing adhesives.

(p) By-product from soybean crop harvested for beans:-

Bean straw (B.P.I. est. 100 lbs. per bu. of beans) .....680,000 tons.

(q) Soybean straw available for industrial utilization:- .....449,000 tons.

Estimated that 75 per cent of straw produced in most concentrated areas of production--Illinois, Indiana, North Carolina, Iowa, Missouri and Ohio--would be available for industrial utilization.

(r) Soybean straw used for industrial purposes .....None.

Trends in utilization of Soybean Products

Consumption of soybean oil for paints and varnishes has increased rapidly in recent years (1931 - 3,128 tons; 1932 - 3,742 tons; 1933 - 4,284 tons; 1934 - 5,225 tons). It will probably continue to increase. There is also a probability of steady increase in the quantity of soybean oil used for caulking compounds. Use of soybean meal for molded plastics and adhesives will probably increase. Installation of plants in the South for the extraction of soybean oil would stimulate production.

SUMMARY OF STATISTICS ON FLAXSEED

The statistics of production are the average for the crop years 1930, 1931 and 1932, and those relating to utilization are the average of figures for the years 1931, 1932, and 1933.

(a) Acreage harvested .....2,708,000 acres.
(Av. 1930-1932)

(b) Average yield per acre (5.5 bu.) .....0.154 ton.
(1930-1932)

(c) Production (14,919,000 bu.) .....417,732 tons.
(1930-1932)

(d) Required for seed (953,000 bu.) .....26,684 tons.
(Av. 1931-1933)

(e) Available for industrial utilization .....391,048 tons.
(1931-1933)

(f) Potential production of linseed oil, estimated, 33% .....129,046 tons.

(g) Potential production of linseed cake and meal .....262,002 tons.

(h) Net imports of flaxseed (oil equiv. 111,572 tons) .....338,100 tons.

(i) Flaxseed crushed .....637,560 tons.

(j) Linseed oil produced .....208,434 tons.

(1) From domestic seed ..... 128,666 tons.

(2) From imported seed ..... 79,768 tons.

(k) Linseed cake and meal produced .....429,126 tons.

(l) Net imports of linseed oil .....1,459 tons.

(m) Net exports of linseed cake and meal .....186,596 tons.

(n) Factory consumption of linseed oil in United States (1931-33):-

(1) Paint and varnish .....176,039 tons.

(2) Linoleum and oil cloth .....18,879 tons.

(3) Printing ink .....5,287 tons.

(4) Soap ..... 576 tons.

(5) Miscellaneous products .....2,168 tons.

Flaxseed (Continued)

(o) By-products of flax crop (estimated from production, using straw to seed ratio of 4:1, suggested by B.P.I., and assuming straw is composed of 20% bast and 80% shives)

(1) Total straw ..... 1,671,000 tons

(2) Bast straw ..... 334,000 tons

(3) Shives ..... 1,337,000 tons

(p) Flax straw available for industrial utilization ...Estimate 1,367,000 tons

(Flax straw is suitable for the manufacture of paper and fiber board. However, in 1934, twenty per cent of the flax was produced in States which have no paper and fiber board plants, presumably because of unfavorable conditions. It is assumed that eighty per cent would be available for the manufacture of paper and fiber board)

Bast straw suitable for paper, fiber board and tow manufacture, Estimate ..367,000 tons

(q) Flax straw utilized for industrial purposes:-

Since 1928 flax straw has been used at two plants in Minnesota for the manufacture of insulating boards, accustical quilts and tow for upholstering. In 1935 one plant was idle, and it is not known if it is in operation at the present time.

Guess, not over.. 15,000 tons

SUMMARY OF STATISTICS ON SUGAR CANE

The statistics are the averages of figures for the five-year period, 1929 to 1933, inclusive, except as noted in parentheses.

(a) Acreage harvested for sugar, Louisiana .....162,200 acres

(b) Average yield of cane per acre, Louisiana .....16.3 tons

(c) Production of cane, Louisiana .....2,641,000 tons

(d) Raw sugar production, Louisiana .....193,800 tons

(e) Refined sugar equivalent of "d" .....181,600 tons

(f) By-Products of sugar manufacture, Louisiana:-

(1) Black strap molasses (11,621,400 gals.) .....68,276 tons
(assuming 1 gallon weighs 11.75 lbs.)

(2) Other molasses (5,197,400 gals.) .....30,535 tons

(3) Bagasse fiber, bone-dry (est. from "c") .....330,000 tons
(assuming 1 ton cane yields 500 lbs. bagasse cont. 50% fiber)

(g) Acreage harvested annually for sugar, Hawaii .....136,942 acres

(h) Average yield of cane per acre, Hawaii .....60.2 tons

(i) Cane harvested per year, Hawaii .....8,243,644 tons

(j) Raw sugar production per year, Hawaii .....972,194 tons

(k) Refined sugar equivalent of "j" .....920,455 tons

(l) By-products of sugar manufacture, Hawaii:-

(1) Black strap molasses)
(2) Other molasses) .....(24.8 lbs. per 100 lbs. comm. sugar).....241,104 tons

(3) Bagasse fiber, bone-dry basis .....1,077,225 tons
(cane yields 22.14% bagasse, containing 56.8% fiber)

(m) Raw sugar production, Puerto Rico (1929-1931) .....748,900 tons

(n) By-products of sugar manufacture, Puerto Rico (1929-1931):-

(1) Black strap molasses)
(2) Other molasses) ....(Est. from 6,493,600 tons cane (Assuming 1 ton yields 4.4 gal.) (28,571,840 gal., 11.75 lbs. ea.)..167,860 tons

(3) Bagasse fiber, bone-dry basis .....909,000 tons
(Est. from 6,495,600 tons cane, assuming 14% fiber content)

Sugar Cane (Continued)

(o) Raw sugar production, Virgin Islands .....4,608 tons
(unofficial est.)

(p) By-products of sugar manufacture, Virgin Islands:-

(1) Black strap molasses) (Assuming yield per ton of cane)
) .....(to be same as that estimated) 1,035 tons
(2) Other molasses) (for Puerto Rico)

(3) Bagasse fiber, bone-dry basis .....5,600 tons
(assuming yield of sugar and by-prods. to be same as for P.R.)

(q) Raw sugar production, Philippine Islands .....1,242,512 tons

(r) By-products of sugar manufacture, Philippine Islands:-

(1) Black strap molasses) (assuming yield per ton of cane)
) .....(to be same as that estimated) 273,000 tons
(2) Other molasses) (for Puerto Rico)

(3) Bagasse fiber, bone-dry basis .....1,478,600 tons
(8.5 tons cane required to produce 1 ton sugar; assuming cane contains 14% fiber)

(s) Acreage of sugar cane harvested for sirup, United States .....109,600 acres

(t) Average yield of sirup cane per acre (est. from "v") .....9.0 tons
(assuming one ton cane yields 17-1/2 gal. sirup)

(u) Production of sirup cane .....986,400 tons
(estimated from "s" and "t")

(v) Average yield of cane sirup per acre, U.S. (159.4 gal.) .....About 0.9 tons

(w) Production of cane sirup, U.S. (17,446,000 gal.) .....98,134 tons

(x) By-products of cane sirup manufacture, United States:-

(1) Filter press cake, dry .....986 tons
(est. 2 lbs. per ton of cane)

(2) Bagasse, bone-dry basis .....147,960 tons
(assuming 1 ton cane yields 900 lb. bagasse containing 2 parts of water to 1 part dry matter)

(y) Net imports of sugar into United States .....3,414,526 tons
(including imports from Virgin Islands and Philippine Islands; not including shipments from Hawaii and Puerto Rico)

SOURCES OF STATISTICS AND INFORMATION

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4. Census of Manufactures, 1929 and 1931 (Bureau of the Census).

5. Flaxseed, Abstracts and List of References. Rev. 1935 (Bureau of Agricultural Economics, Grain Division).

6. Fruit Crops, Review of 1934 Season (Bureau of Agricultural Economics, Division of Crop and Live Stock Estimates).

7. Fruits: Apples, Citrus, Peaches, etc., Outlook Charts, for use with the Agricultural Outlook for 1935 (Bureau of Agricultural Economics, November, 1934).

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